

## Superfund Technology Transfer Strategy:

### Advancing Technology Innovation in Site Cleanups<sup>1</sup>

Since the inception of the Superfund program, federal, state, tribal and local governments, and private industry have committed billions of dollars annually to clean up hazardous waste sites. Continuous improvements to site characterization, remediation technologies, and cleanup strategies provide an opportunity to improve Superfund cleanup effectiveness.

The Technology Innovation Program within the Office of Superfund Remediation and Technology Innovation (OSRTI) is dedicated to advancing promising state-of-the-art technologies and tools for streamlining and improving site remedy performance, reducing costs and accelerating cleanups. Over the last 20 years, the program has helped advance program practice in a number of areas, including:

- Increasing use of in situ treatment technologies to address source contamination at groundwater sites to shorten cleanup timeframes and move away from the almost exclusive reliance on pump and treat technologies for groundwater remediation;
- Broadening application of high-resolution site characterization tools to better understand subsurface conditions and contaminant fate and transport to allow more successful, effective and targeted remedies; and
- Facilitating widespread, strategic use of field analytical technologies to speed up soil investigations and cleanup while improving the defensibility of site decisions and reducing the number of mobilizations, which are costly and disruptive to affected communities (see case example, p.2).

OSRTI seeks to strategically leverage the information and knowledge generated through work across its four **interconnected technology transfer elements** (Figure 1):

**Technical Support.** OSRTI provides direct technical support to site managers in the Superfund remedial and removal programs. We provide access to very specific scientific and technical knowledge as well as skills and tools to implement innovative practices not readily available on the market and help EPA project managers deploy innovative technologies or practices which improve understanding of site conditions. Our technical support efforts are an excellent mechanism to “deliver” applied innovation and to gather insights on challenges experienced in the field. When advancing technologies and practices in early stages of development, we collaborate closely with the EPA’s Office of Research and Development (ORD).



*Figure 1: Superfund’s four main tech transfer capabilities feed into, and are driven by, a core knowledge of innovative technology needs, opportunities and practices.*

<sup>1</sup> Prepared by TIFSD, June 2019 for internal agency use

**Technology Assessment.** Superfund pursues multiple venues to obtain and disseminate information on the performance of innovative technologies. We have the capability to perform technology assessments in several locations, including NPL sites, other federal agency sites, university research centers and private sector facilities. Evaluations are often conducted in collaboration with ORD. Technology assessment information can result in:

- Broad technology overviews, such as the technology focus areas (e.g., in situ thermal treatment, chemical oxidation and reduction) on the CLU-IN website, <https://clu-in.org> ;
- Technology survey reports, such as the upcoming mining technology handbook or cumulative analyses of specific site types (*Examples of Groundwater Remediation at NPL Sites*);
- Site-specific case studies of innovative technology applications;
- Case studies on site-specific pilot studies; and
- Comprehensive reports on technology usage, such as the biennial *Superfund Remedy Report*.

**Superfund Program Training.** OSRTI develops and manages the broad programmatic and technical training program for Superfund remedial project managers, on-scene coordinators, site assessment managers, and other technical support staff. When developing course curricula and training materials, OSRTI advances innovative practices by targeting key technical messages to core audiences and delivers these messages within broader courses on remedial and removal processes, in technology-specific classes such as “Best Practices for Site Characterization,” NARPM training, or live Internet webinars.

**Outreach.** Superfund’s broad outreach network serves a large audience across EPA; other federal agencies; state, tribal and local governments; researchers; consulting and engineering firms; and technology developers. Our cleanup technology websites had over 3 million sessions in 2018 and more than 24,000 individuals participated in our live webinars. Users downloaded more than 1.1 million technical documents. In addition, we disseminate information through electronic newsletters such as *TechDirect* (with over 39,000 subscribers), live and archived webinars, and technology reports. As the primary and widely recognized clearinghouse for information on cleanup technologies and approaches, we have an enviable capability to identify and reach target audiences and to track the information they access most often. We also enjoy high credibility among our core audiences, built over 25 years, as a trusted source of information.

**Leveraging Partnerships.** OSRTI’s tech transfer capabilities are greatly enhanced through partnerships with federal and states agencies with a shared interest in advancing innovation. We collaborate with the **Interstate Technology Regulatory Council** (part of the Environmental Council of States) in developing technical guidance and outreach; the **Federal Remediation Technologies Roundtable** (interagency) for sharing lessons learned among federal agencies; and the Department of Defense’s **Environmental Research Programs** in researching and demonstrating innovative technologies. Through its ongoing tech transfer efforts, OSRTI has contributed to advancing the practice and acceptance of innovative tools and technologies, such as broadening the suite of in situ treatment options for contaminated groundwater, expanding the use of high-resolution site characterization, and fostering acceptance of field portable analytical technologies such as x-ray fluorescence (XRF, see case example above).

#### Case Example:

##### Successful Technology Transfer for Field-portable X-Ray Fluorescence

XRF provides real-time measurement of metals and other elements in soil. Even as XRF detection limits and costs decreased and safety questions were resolved, its widespread use was hindered by legacy sampling protocols, inadequate quality assurance and challenging contracting mechanisms unable to maximize the value of real-time data.

Leveraging knowledge acquired through our technical support and evaluations, OSRTI conducted an effective technology transfer and training effort, which significantly contributed to broad acceptance of XRF and fostered innovative uses of the technology as an effective tool at sites contaminated by heavy metals. XRF is being used to delineate areas of contamination at the recently listed **Southside Chattanooga Lead site** in Chattanooga, TN. Region 4’s site team, with OSRTI assistance, developed **XRF sampling protocol** that greatly reduced the number of field mobilizations, saving time and money. The lessons learned during this technical support event are informing the approach’s application at other sites.